REMARKS

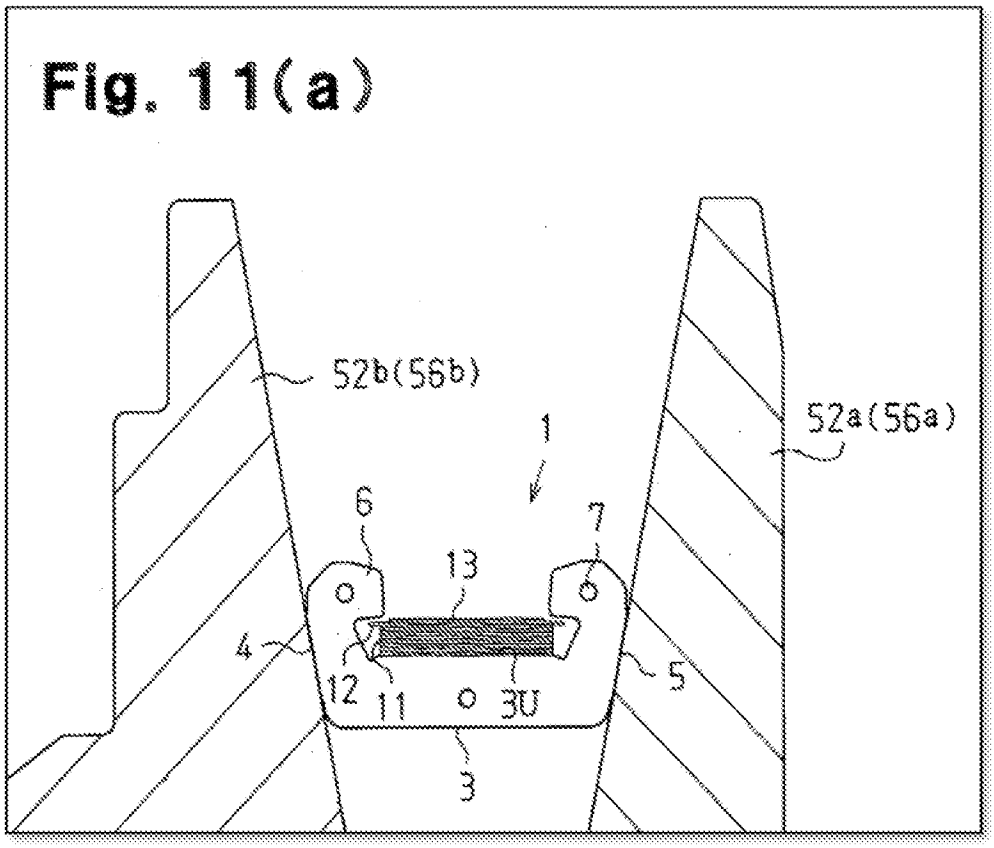
Status of the Claims

Only claims 13 and 15 – 18 are pending. Claims 11, 12, 19, 21, 22, and 25 have been cancelled. Claims 1 – 10, 14, 20, 23, 24, and 26 have been withdrawn from consideration.

Brief Description of the Claimed Subject Matter

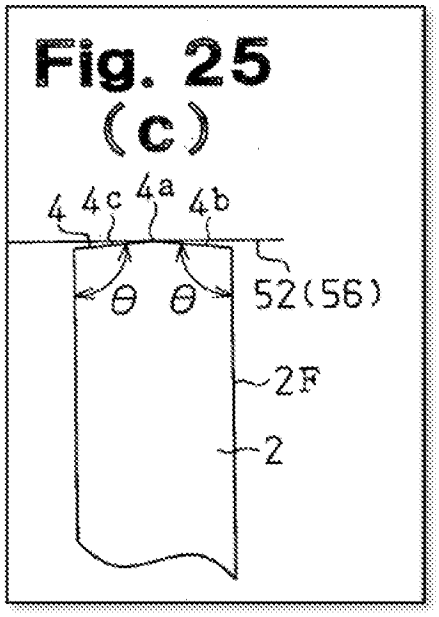
Both independent claims 13 and 15 relate to a push block for use with a metallic belt wound between annular V-grooves of a drive pulley and a driven pulley. According to both independent claims the push block must have a front surface, a rear surface, and a side contact surface. The side contact surface must oppose the inner side surfaces of the annular V-grooves of both pulleys.

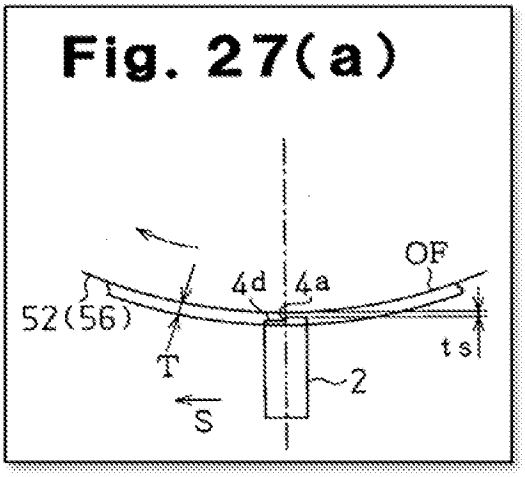
Figure 11(a), partially reproduced below, illustrates how a contact surface 4 opposes the inner side surfaces of the annular V-groove of a pulley 52(56).



Claims 13 and 15 both require the contact surface (or halves thereof) to form an obtuse angle with the front surface and with the back surface. And the claims both require the contact surface to have a ridge line that functions as an oil film breaking portion to break an oil film, which forms on the inner side surfaces of the annular V-grooves of the pulleys.

Figure 25(c), reproduced below illustrates a ridge line 4a. The ridge line 4a opposes an inner side surface of the annular V-groove of a pulley 52(56). The ridge line 4a also divides the contact surface 4 into two halves 4b and 4c. These halves form obtuse angles with the front and rear surfaces of the push block 2.

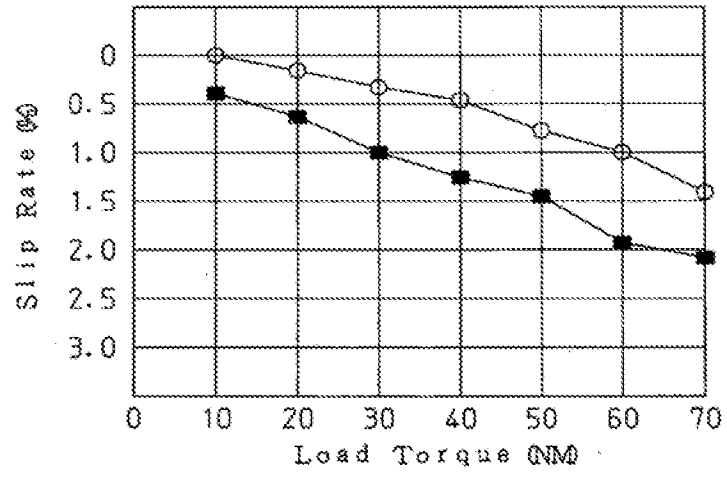




Providing ridge line 4a breaks down the oil film that forms on the inner side surfaces of the annular V-grooves of the pulleys, thereby improving the torque transmission efficiency. More specifically, as illustrated in Figure 27(a), reproduced above, the ridge line 4a breaks up an oil film OF, reducing its thickness T to a tolerable thickness ts. This reduction allows a larger percentage of the clamping pressure acting on the push block 2 from the pulleys 52 and 56 to be transmitted as forward drive torque to the push block.

Data comparing a prior art example and a metallic belt using the push block having a ridge line according to the present invention is presented in Figure 15 of the present specification. Figure 15, shows that the present invention (white circles) provides superior torque transmission efficiency relative to the prior art (black squares).

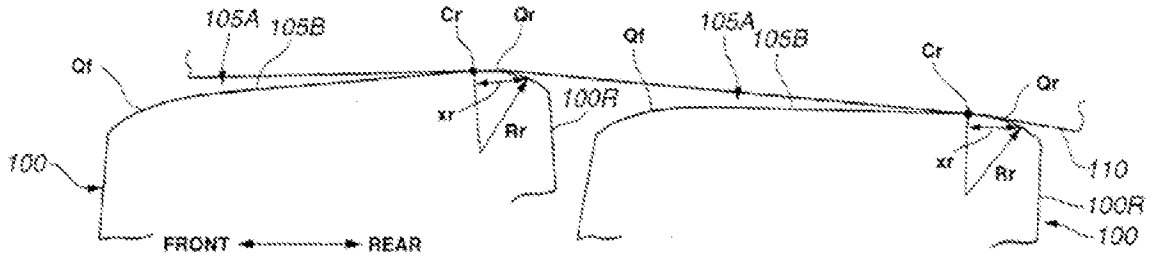
Fig. 15



Claim Rejections

All of the rejections incorrectly rely on US 2003/0162616 by Miura (hereinafter, Miura) to teach a contact surface having the required ridge line. More specifically, the Office Action asserts contact surface 105b has a ridge line at Cr as illustrated in Figure 3 of Miura. This assertion is incorrect, because surface 105 does not contact a pulley; it contacts metal ring assembly 110.

FIG.3A



I. The rejection of claim 13, citing 35 U.S.C §103(a), US 6,270,437 to Yoshida et al. (hereinafter, Yoshida), and Miura is traversed and should be withdrawn.

Yoshida discloses that a plurality of push blocks are superimposed with one another along the longitudinal direction of a metallic belt 15. The push block has a front surface located at a front side of the push block in a travel direction of the push block, a rear surface located at a rear side of the push block, and a side contact surface 37 opposing inner side surfaces of the annular V-grooves of pulleys. The side contact surface 37 extends between the front and rear surfaces and has an associated lengthwise direction and an associated widthwise direction that is parallel to the travel direction of the push block. Column 5, lines 32 to 37 of Yoshida state, "a pair of pulley contact surfaces 37, 37 are formed which make contact with the V-faces 30, 30 of the drive pulley 6 or the driven pulley 11."

Yoshida fails to disclose the claimed feature in which a front half 4b of the side contact surface 4 forms an obtuse angle Θ with the front surface 2F of the push block, a rear half 4c of the side contact surface forms an obtuse angle Θ with the rear surface 2B of the push block, and a ridge line 4a comprising a line formed by an intersection of the front half and the rear half, the ridge line 4a functioning as an oil film breaking portion for breaking an oil film, which forms on the inner side surfaces of the annular V-grooves of the pulleys, and extends along the entire length of the contact surface 4 in substantially the lengthwise direction and at a middle part of the contact surface in the widthwise direction. See Fig. 25(c) of the present application (reproduced above).

Yoshida's block does not have a ridge line on a side contact surface that functions as an oil film breaking portion. The Office Action cites Miura to compensate, incorrectly asserting:

> Miura teaches a front half of a contact surface (105b) forming an obtuse angle with a front surface (100f) of the push block, and a rear half of the contact surface

> (105b) forming an obtuse angle with a rear surface (100r) of the push block (100), and a ridge line (contact surface at Cr) (Fig. 3a) comprising a line formed (when the 105b and curve Cr meet, a line is formed) by an intersection of said front half and said rear half ...."

To the contrary, the contact surface 105b is located on a saddle surface 105a as shown in Figure 1 of Miura. Also, as described in paragraphs [0003] and [0055] of Miura, an inner circumferential surface of a metal ring 110 is suppressed from contacting front ridges and rear ridges of metal elements or push blocks 100 so that stress concentration between the ridges of the saddle surfaces of the metal elements and the metal ring 100 is avoided.

Accordingly, the ridges of the push blocks disclosed in Miura do not contact the inner side surfaces of the annular V-grooves of the pulleys and thus do not break the oil film formed on the pulleys. The ridges of Miura are formed on the saddle surface 105a. This is totally different from the claimed ridge line.

Therefore, it would not have been obvious to one of ordinary skill in the art to modify the push block in Yoshida with the ridges of Miura to break the oil film formed on the pulleys.

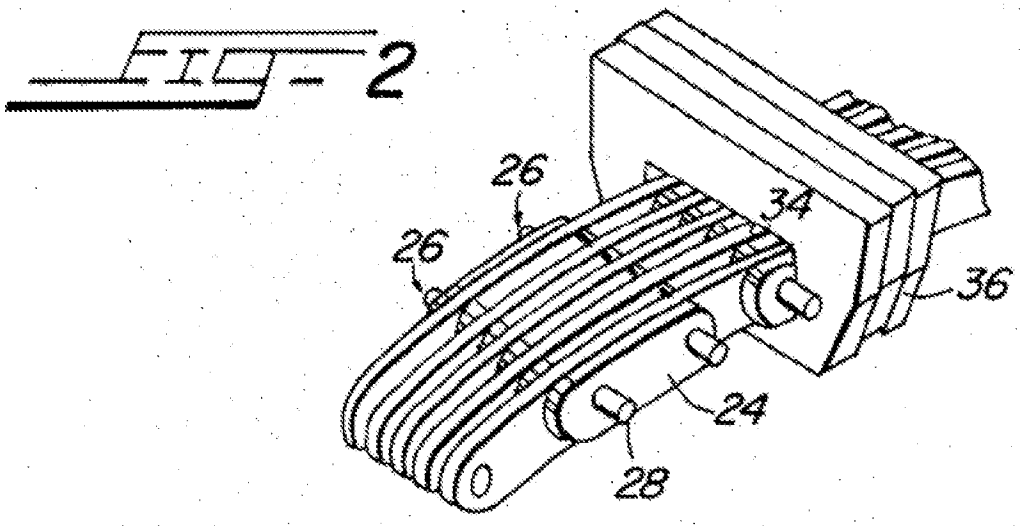
II. <u>The rejection of claims 15 and 16, citing 35 U.S.C §103(a), US 4,386,922 to Ivey (hereinafter, Ivey) and Miura is traversed and should be withdrawn.</u>

Ivey discloses a push block for use with a metallic belt wound between annular V-grooves of a drive pulley and a driven pulley. A plurality of push blocks 30 are engaged and superimposed with each other. See Figs. 1 and 2. Each push block 30 has a front surface, a rear surface and a side contact surface 36 opposing inner side surfaces of the annular V-grooves of the pulleys. The side contact surface has a lengthwise direction and a widthwise direction that is transverse to the lengthwise direction. The widthwise direction is parallel to a travel direction of the push block 30. See Fig. 3.

The Office Action incorrectly asserts:

> Ivey teaches 'a front portion of the contact surface forming an obtuse angle with a front surface of the push block (30), and a groove (space where block B is) extending along the entire length of the contact surface at the middle of the contact surface (36), wherein an inner wall of the groove and the contact surface defines the ridge line that functions as the oil film breaking portion, which forms on the inner side surfaces of the annular V-grooves of the pulleys (see Fig. 2)."

This assertion is incorrect, because, as can be seen from Fig. 2 of Ivey, a ridge line is formed on a side contact surface 36 of the push block 30. But the ridge line of Ivey extends parallel to a travel direction of the belt so that it does not function as the oil film breaking portion.



A groove is certainly formed between the push block and a link. But the groove is far away from the inner side surface of the annular groove of the pulley and thus the push block cannot break an oil film formed on the inner surface of a pulley V-groove.

Miura is applied, because the Office Action acknowledges Ivey does not teach the required ridge line:

> Ivey does not teach 'and a front half of the contact surface forming an obtuse angle with a front surface

> of the push block and a rear half of the push block and a ridge line comprising a line formed by an intersection of said front half and said rear half, said ridge line function as an oil film breaking portion for breaking an oil film, ...

As discussed above, the alleged ridge line of Miura does not contact a pulley, but instead metal ring assembly. Therefore, the alleged ridge line of Miura does not and cannot function to break an oil film. Even if Ivey and Miura were combined, the claimed invention would not be achieved.

III. The rejection of claim 17, citing 35 U.S.C §103(a), Ivey, Miura, and US 4,718,881 to Sugimoto (hereinafter, Sugimoto) is traversed and should be withdrawn.

Sugimoto is not cited to compensate for the shortcomings of Ivey and Miura. The rejection should be withdrawn for the same reasons already discussed.

IV. The rejection of claim 18, citing 35 U.S.C §103(a), Ivey, Miura, and US 6,086,499 to Brandsma (hereinafter, Brandsma) is traversed and should be withdrawn.

Brandsma is not cited to compensate for the shortcomings of Ivey and Miura. The rejection should be withdrawn for the same reasons already discussed.

Fee Authorization

The Director is hereby authorized to charge any deficiency in fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account 14-1437. Please credit any excess fees to such account.

Conclusion

The present application is in condition for allowance and favorable action is requested. In order to facilitate the resolution of any questions, the Examiner is welcome to contact the undersigned by phone.

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